

WHAT IS CLAIMED IS:

1. A high thermal conductive aluminum nitride sintered body having: a thermal conductivity of $220 \text{ W/m} \cdot \text{K}$ or more; and a three point bending strength of 250 MPa or more; wherein a ratio ($I_{\text{Al}_2\text{Y}_4\text{O}_9}/I_{\text{AlN}}$) of X-ray diffraction intensity ($I_{\text{Al}_2\text{Y}_4\text{O}_9}$) of $\text{Al}_2\text{Y}_4\text{O}_9$ (201 plane) with respect to X-ray diffraction intensity (I_{AlN}) of aluminum nitride (101 plane) is 0.002 to 0.03.
2. A high thermal conductive aluminum nitride sintered body according to Claim 1, wherein a ratio ($I_{\text{Y}_2\text{O}_3}/I_{\text{AlN}}$) of X-ray diffraction intensity ($I_{\text{Y}_2\text{O}_3}$) of Y_2O_3 (222 plane) with respect to X-ray diffraction intensity (I_{AlN}) of AlN (101 plane) is 0.002 to 0.06.
3. A high thermal conductive aluminum nitride sintered body having: a thermal conductivity of $200 \text{ W/m} \cdot \text{K}$ or more; and a three point bending strength of 250 MPa or more; wherein a ratio ($I_{\text{Al}_2\text{Y}_4\text{O}_9}/I_{\text{AlN}}$) of X-ray diffraction intensity ($I_{\text{Al}_2\text{Y}_4\text{O}_9}$) of $\text{Al}_2\text{Y}_4\text{O}_9$ aluminum nitride (201 plane) with respect to X-ray diffraction intensity (I_{AlN}) of AlN (101 plane) is 0.002 to 0.06, and a ratio ($I_{\text{Y}_2\text{O}_3}/I_{\text{AlN}}$) of X-ray diffraction intensity ($I_{\text{Y}_2\text{O}_3}$) of Y_2O_3 (222 plane) with respect to X-ray diffraction intensity (I_{AlN}) of AlN (101 plane) is 0.008 to 0.06.
4. A high thermal conductive aluminum nitride sintered body according to Claim 1, wherein said aluminum nitride sintered body contains 0.14 – 1.5 mass% of Y element and 0.05 – 0.5 mass% of oxygen, a mass ratio (O/Y) of oxygen (O) with respect to Y element is 0.5 or less, an average diameter of aluminum nitride crystal grains is $4 \mu\text{m}$ or more, a number of crystal grains existing in arbitrary crystal structure area of $100 \mu\text{m} \times 100 \mu\text{m}$ is 200 or less, a

maximum diameter of grain boundary phase is $0.5\ \mu\text{m}$ or less.

5. A high thermal conductive aluminum nitride sintered body according to Claim 1, wherein said aluminum nitride sintered body contains 0.14 – 1.5 mass% of Y element and 0.05 – 0.5 mass% of oxygen, a mass ratio (O/Y) of oxygen (O) with respect to Y element is 0.6 or less, an average diameter of aluminum nitride crystal grains is $4\ \mu\text{m}$ or more, a number of crystal grains existing in arbitrary crystal structure area of $100\ \mu\text{m} \times 100\ \mu\text{m}$ is 150 or less, a maximum diameter of grain boundary phase is $0.5\ \mu\text{m}$ or less.